withdrawal of this rejection is therefore respectfully solicited.

Claims 5 and 6 have been rejected as being unpatentable over Tsumura *et al.* and Schwabegger *et al.* under 35 U.S.C. § 103(a). The Examiner contends that Tsumura *et al.* substantially describes the claimed biological waste water treatment of the present invention, but admits that it does not teach electrolysis of the waste water. Tsumura *et al.* is said to be directed to the problem of removing phosphorous from waste water. Schwabegger *et al.* is then cited as also being directed to removal of phosphorous from biologically treated waste water, and as allegedly suggesting removing phosphorous by subjecting the waste water to electrolysis treatment. The Examiner thus concludes that it would have been obvious to have done so in Tsumura *et al.* to further the aims and objectives of that reference. This rejection is respectfully traversed for the reasons set forth hereinafter.

In the background section of the present application, applicant sets forth a detailed analysis of the state of the art in connection with the biological treatment of organic waste materials. While various schemes for carrying out such biological treatment are well known, it is an object of this invention to improve upon these various sludge reduction processes by significantly reducing the overall amounts of the sludge material produced in these processes. In accordance with the present invention, and in particular the preferred embodiments of claims 5 and 6 hereof, sludge produced during biological treatment processes can now be significantly reduced by initially subjecting the sludge to biological digestion to convert at least a portion of the organic waste to a clear decant and a mixture of bio-solids and unconverted organic material, a portion of this material is then subjected to an oxidizing agent generated by electrolysis, or by electrolysis

itself, the oxidation reduction potential of the mixture of bio-solids and unconverted organic material is then monitored, and the concentration of the oxidizing agent produced by electrolysis, or by electrolysis itself, is then adjusted in order to maintain the oxidation-reduction potential of that mixture to a value greater than 0mV to produce a conditioned effluent, which is then returned to the initial biological reactor.

Applicant has discovered that by using such a process it is now possible to significantly reduce the amount of sludge produced in such biological treatment processes, at least to an extent far greater than that which has previously been possible.

Turning to the cited references, it is initially noted that neither reference is directed to this goal. While these references thus do relate to biological treatments of various kinds, they are not directed to processes for somehow reducing the sludge produced in these biological treatment processes, and certainly not in the precise manner which applicant utilizes. Indeed, the references assert that they are only concerned with reducing the nitrogen and phosphorous produced in such processes.

Turning first to Tsumura *et al.*, after recognizing the conventional nature of various sewage treatment processes directed to removing organic matter, these patentees specifically direct their attention to the elimination of nitrogen and phosphorous which may cause eutrophication. Therefore, in connection with the apparatus shown in FIGS. 1 and 11 thereof, these patentees have conceived of a system which includes a first aeration tank, a second aeration tank, a final settling tank, and a specific control mechanism therefor. Turning to FIG. 11, it can thus be seen that the control system disclosed in Tsumara *et al.* includes a dissolved oxygen (DO) meter 10a to measure dissolved oxygen concentration in the first

aeration tank 2a, an oxidation-reduction potential (ORP) meter 6b for measuring an oxidation-reduction potential of the second aeration tank 2b, as well as a control panel 9 to generate control signals to an inverter 11a to control the DO concentration of the first aeration tank 2a. Thus, the basic process disclosed in Tsumura *et al.* for increasing the removal of nitrogen and phosphorous requires performing aeration for a predetermined time period in the first aeration tank, and then stopping aeration and initiating the agitation thereof. Then, in the second aeration tank the sum of the aeration period and the agitation period is controlled to a second time period which is longer than the first time period, based on a specific point on the ORP curve detected by the ORP meter, at which point both the first and second aeration tanks are transferred from agitation to aeration. Thus, the teachings in this patent are clearly limited to a specific method of operating a specific system, in which an ORP meter is used in an effort to maximize the removal of nitrogen and phosphorous therein. There is nothing whatsoever taught by Tsumura *et al.* with respect to contacting a portion of a mixture of bio-solids and organic material from a biological reactor with an oxidizing agent produced by electrolysis in a chemical treatment unit; then using an ORP meter to monitor the oxidation reduction potential in such a unit; adjusting the concentration of the oxidizing agent produced by such electrolysis in order to maintain the oxidation reduction potential at a specified level, such as that of claims 5 and 6; and then returning the conditioned effluent produced therein to the biological reactor. The mere fact that the Tsumura *et al.* patent uses an ORP meter for a particular reason, which does not relate to applicant's claimed invention, does not in any way obviate this invention. Applicant has never claimed to have invented ORP meters, but it is the precise way that such equipment is used in connection with the processes of

claims 5 and 6 which constitutes applicant's inventive contribution. Use of an ORP meter in a specific claimed process in which a biological reactor is followed by the chemical treatment unit specified in these claims, namely one in which a portion of the bio-solids and unconverted organic material is contacted with an oxidizing agent comprising electrolysis, clearly distinguishes this invention from anything suggested by Tsumura *et al.*

Any attempt to overcome these deficiencies in Tsumura *et al.* by combining this reference with Schwabegger *et al.* cannot successfully overcome these deficiencies in the primary reference. Schwabegger *et al.* is solely directed to reduction of the phosphorous content of waste water. In particular, these patentees claim to have reduced such phosphorous content by subjecting the waste water to electrolysis, leading to phosphorous precipitation so that a phosphorous-enriched sludge is produced. It is thus unclear precisely how this invention could even be incorporated into the Tsumura *et al.* process. However, even if this were done, it would not result in the presently claimed process. Firstly, Schwabegger *et al.* merely contact waste water with metal electrodes so that phosphate ions are precipitated at the cathode. Like Tsumura *et al.*, this process has nothing to do with the principal object of the present invention; namely, using electrolysis in a specified process in order to increase the biodegradable nature of a biomass.

As for the impropriety of this particular combination of references, since the Tsumura *et al.* patent discloses a technique for increasing the removal of phosphorous, there would certainly be no reason to use Schwabegger *et al.* <u>in combination</u> with Tsumura *et al.* Indeed, the only logical way to utilize the teachings of Schwabegger *et al.* would be to merely <u>substitute</u> its process for the entire process of Tsumura *et al.* There is

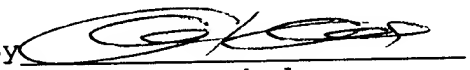
no simple way that the Schwabegger *et al.* invention could be incorporated into Tsumura *et al.* Even if this were attempted, however, one would not then somehow arrive at the presently claimed process. There is no suggestion in these cited references to carry out biological digestion in a biological reactor to convert a portion of the organic waste to a clear decant and a mixture of bio-solids and unconverted organic material, and to then contact at least a portion of this mixture with at least one oxidizing agent produced by electrolysis, while monitoring the ORP of the mixture in the chemical treatment unit, so that the concentration of the oxidizing agent contacted with the mixture can be adjusted to maintain the ORP at a predetermined level of greater than 0mV in order to provide a conditioned effluent which is then returned to the biological reactor. This process is simply not suggested by either of these references, either alone or in combination.

It is therefore respectfully submitted that claims 5 and 6 in this application clearly possess the requisite novelty, utility and unobviousness to warrant their immediate allowance, and such action is therefor respectfully solicited. If, however, for any reason the Examiner still does not believe that such action can be taken at this time, it is respectfully requested that he telephone applicant's attorney at (908) 654-5000 in order to overcome any further alleged deficiencies in this application.

Finally, if there are any additional charges in connection with this requested amendment, the Examiner is authorized to charge Deposit Account No. 12-1095 therefor.

Dated: July 25, 2002

Respectfully submitted,

By 

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